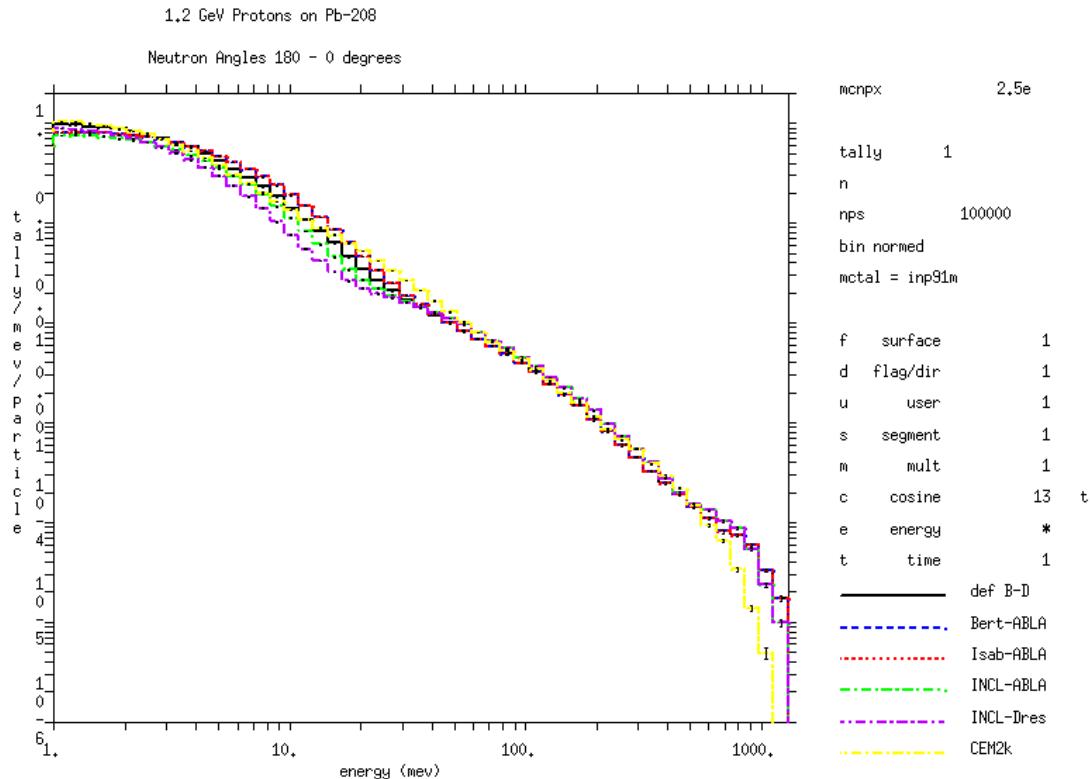


MCNPX Physics Models

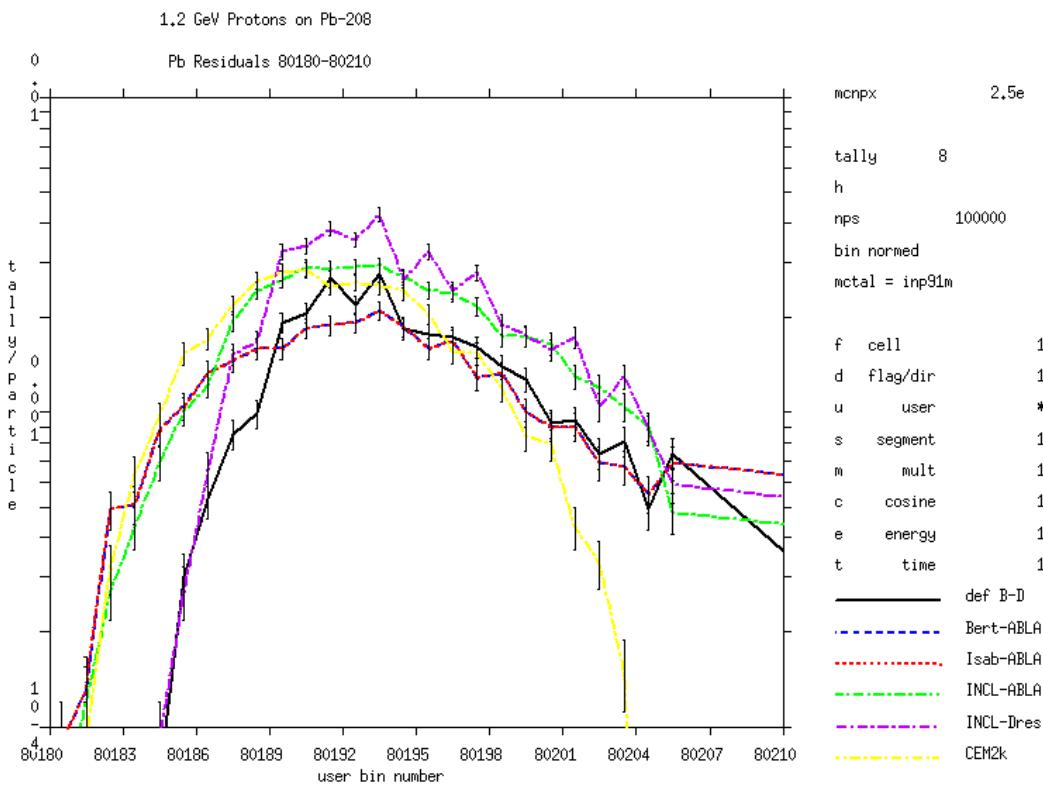
The following two plots illustrate various combinations of MCNPX physics models used to calculate differential cross sections and residuals.



The double differential cross sections of neutron production from 1.2 GeV protons on Pb-208 using 6 MCNPX model combinations are plotted above. The models are Bertini / Dresner (default), Bertini / ABLA, ISABEL / ABLA, INCL / ABLA, INCL / Dresner, and CEM2k.

The plot command is:

```
rmc inp91m loglog xlim 1 1300 ylim 1e-6 2 fix c 13 lab "def B-D" &
title 1 "1.2 GeV Protons on Pb-208" title 2 "Neutron Angles 180 - 0
degrees" &
cop rmc inp92m lab "Bert-ABLA" cop rmc inp93m lab "Isab-ABLA" &
cop rmc inp94m lab "INCL-ABLA" cop rmc inp95m lab "INCL-Dres" &
cop rmc inp96m lab "CEM2k"
```



The residual nuclei of ^{80}Hg production from 1.2 GeV protons on Pb-208 using 6 MCNPX model combinations are plotted above.

The MCNPX tally plot command is:

```

rmc inp91m tal 8 free u linlog xlim 80180 80210 10 ylim .0001 .01 &
title 2 "Pb Residuals 80180-80210" lab "def B-D" &
cop rmc inp92m tal 8 lab "Bert-ABLA" cop rmc inp93m tal 8 &
lab "Isab-ABLA" cop rmc inp94m tal 8 lab "INCL-ABLA" &
cop rmc inp95m tal 8 lab "INCL-Dres" cop rmc inp96m tal 8 lab "CEM2k"

```

The input file producing these INCL / ABLA results is:

```
Test of p(1.2GeV)+Pb(208)
1 1 -11. -1 imp:h 1
2 0          1 imp:h 0

1 so .01

mode h n
sdef par h erg=1200 vec 0 0 1 dir 1
m1 82208 1
phys:h 1300 j 0
phys:n 1300 3j 0
print
prdmp 2j -1 2
nps 100000
f8:h 1
ft8 res 1 99
fq8 u e
fq1 e c
*c1 167.5 9i 17.5 0 T
e1 1 50log 1300 T
fc1 *** neutron angle spectra tally ***
f1:n 1
ft1 frv 0 0 1
c lca 2 1 1 23 1 1 0 1 0      $ default
c lea 1 4 1 0 1 0 0 1      $ default
lca 2 1 0 23 1 1 0 -2 2      $ INCL4
lea 1 4 1 0 1 0 2 1      $ ABLA
```